19/C

PROGRESS REPORTS

FROM

EXPERIMENT STATIONS

SEASON 1956-1957

SURVEY OF REPORTS

PUBLISHED BY
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PROGRESS REPORTS FROM EXPERIMENT STATIONS. SEASON 1956-57

A full list of the reports published for the season 1956-57 is given below; the price post free is 7/6d. for the set, or 1/- each for individual reports.

1. Uganda.
2. Kenya.
3. Tanganyika—Lake Province.
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SURVEY OF PROGRESS REPORTS
FOR THE SEASON 1956-57

BY

D. F. RUSTON.

General.

The overseas staff of the Corporation, by agreement with the Governments concerned, continued to work in the same eight territories as before, namely Uganda, Kenya, Tanganyika, Nyasaland, Northern Nigeria, the Republic of the Sudan, Aden and the West Indies. At all stations except the Cotton Research Station at Namulonge in Uganda, which is owned and run by the Corporation, the staff work on Research Stations belonging to the Departments of Agriculture, where houses, laboratory facilities and local staff are provided by Government.

In the season 1956-57 over 1,435,000 bales were produced by these eight territories, some 200,000 bales more than the record set up the previous season. The main increase came from the Sudan, where a crop of over 700,000 bales was produced, no less than 33% greater than that of the previous year, which was at the time the largest cotton crop ever produced there.

Another record crop was also harvested in Tanganyika, this being the fourth successive year in which the record has been broken. Cotton production in Tanganyika since 1953-54 has risen steadily—102,000 bales, 122,000, 133,000, and now 168,000. These figures reflect great credit on all concerned with cotton growing in this territory.

In other areas in which Corporation staff were working the cotton crops showed comparatively little change from those of the previous season.

The effects of the new strains selected or developed by the Corporation's staff continued to make themselves felt. In Uganda the BP52 selections which are ultimately to replace the present commercial strain are being multiplied. In Tanganyika the new Uk55 will replace Uk51 throughout the Lake Province within the next few years, whilst the new strain I158 is being bulked to take the place of 47/10 in the Eastern Province. One of the Albar strains, A637, is likely to be grown throughout Nyasaland by 1961-62, and in Nigeria 26J is being bulked and will ultimately replace the present 26C. All these new strains are higher yielding than the present commercial varieties. Most have a higher ginning outturn, and all are equal to, or slightly better in quality than, the present strains.

The effect of diseases made itself felt more than usual during the past year, and it is evident that a careful watch will be needed to see that all possible steps are being taken to keep them under control. Thus, in Aden a form of root rot caused considerable damage in certain areas, whilst in Tanganyika and Uganda *Fusarium* wilt disease was found on an increasing scale, and bacterial blight disease continued to take its toll of the crop practically everywhere, in spite of the increased use of resistant varieties and of treatment of the seed before planting.

The entomologists continued their study of insect pests and of control measures. It now seems clear that the use of insecticides is only likely to be of economic importance where conditions for growth are good, so that high yields can be obtained in the absence of pests. Water supply and climate must be satisfactory; planting must be carried out at the optimum time; thinning, weeding and the general standard of cultivation must be good. Even then, if the growing season is long, cotton which has lost its lower crop through insect damage may be able to set a satisfactory top crop without help from insecticides.

Investigations into the relationship between soil moisture and the cotton crop are being undertaken in East Africa, Nigeria and Aden. It seems likely that this will prove to be an exceedingly important point, and that when more is known on this problem it should be possible to increase yields quite considerably.

Uganda.

Cotton Research Station, Namulonge.

Development continued and the total area under control amounted to over 900 acres.

Costings studies were started on a preliminary scale and gave interesting results. Over roughly 64 acres of bulk cotton, pre-planting cultivation and machine planting averaged $4\frac{3}{4}$ tractor hours per acre, which at 20/- per hour cost 95/-. Labour requirements after planting averaged 123 man days per acre, of which picking took roughly 78, or 63%. 34 days were taken up in weeding, and at a cost of Shs. 2/80 per man day, and allowing the sum of 15/- per acre for transport, the total cost per acre came to Shs. 454. Average production was 1,076 lb. seed cotton, bringing in 588/- at an average of between 54 and 55 cents per lb. This left a balance of Shs. 134 per acre to cover the cost of overheads, land, management, and profit.

An analysis of farm bulk yields over the last 7 years shows that the highest average yields have been obtained from sowings made in the second half of June. The average yields of plantings made in the first half of July, however, were almost the same as the average for plantings in the first half of June. When studying these figures, it should be remembered that bulk planting on the Research Station is carried out by machine, which is preferable to hand planting in the

time of light rains, since the press wheel of the planter gives better compaction of the soil.

Supplementary irrigation trials were carried out to study the role of water in the growth of the cotton plant. The overhead sprinklers used made it possible to apply much smaller amounts at one time than with furrow irrigation. During the season there were 3 dry periods when supplementary irrigation was particularly necessary—the first from the end of September until the third week in October; the second in late November; and the third in December/January. The general results of the irrigation trial were disappointing, owing to red spider attack following "blanket" applications of insecticide against *Lygus*. One experiment, however, escaped the full impact of this attack, and here 3 ins. of supplementary irrigation gave a yield of 1,180 lb. seed cotton per acre, against 1,640 lb. for 5·3 ins., and 1,830 lb. for 5·6 ins. Sprinkler irrigation had little or no effect on the amount of blackarm damage.

Studies were started on the interaction of plant nutrients and supplementary water. Owing to poor rainfall in June and July, 4 ins. of supplementary irrigation had to be given to the whole experiment. The overall effect of additional water over and above this general 4 ins. was negligible when taken by itself, but extra water, nitrogen and phosphate taken together gave an increase of 44%.

In another experiment under rainfall, nitrogen and sulphur had no effect on yield: potash gave a slight increase, and phosphate a bigger one. It is probable that phosphate shortage can at times be a restricting factor at Namulonge, but the response obtained, which has varied from nil to 30% in recent years, appears to be influenced by rainfall and soil moisture.

In the crop loss experiment the usual DDT/toxaphene mixture was sprayed to run-off at weekly intervals. Unlike the previous seasons, this year spraying led to a general reduction in total shedding and significant yield increases were obtained. Spraying throughout the season increased yield by 20% over the unsprayed control, whilst spraying late in the season gave an even higher increase of 36%. This season there was no recovery from insect damage on control plots, possibly due to climatic conditions.

The most obvious symptom of *Lygus* damage is severe leaf tattering, and an attempt was made to simulate the effect of *Lygus* damage by removing mechanically different proportions of the total leaf area. It was clear from this experiment that *Lygus* does not simply damage the leaf mechanically but there is some physiological disturbance to the plant in addition.

The angular leaf spot phase of bacterial blight was more prevalent than in previous years, but the stem and boll phases were not severe. Stem infections appear to be closely associated with early leaf infection.

In an experimental attempt to assess the damage caused by bacterial blight, the artificial inoculation of seed with the disease led to a significant depression of yield in comparison with natural seed which had been treated with a mercurial dressing.

Tests on DE715/6M, the new strain to be multiplied up to replace S47, showed that it had good resistance to *Verticillium* wilt.

BP52/7MB gave a 21% yield increase over local BP52 in 14 district variety trials, and two new strains, C(55)6 and C(55)3, gave a 20% increase over 7MB in trials in 5 localities.

Original bulks were made up during the year for Albar and UPA by mixing an equal number of seeds from all single plants selected from UPA and Albar material in the previous season. UPA and Albar were several days earlier than BP52, with means of 84 and 85 days to first flower against 89 days for BP52/8MB.

Serere.

In small bulk trials Albar and related stocks, with an average of 456 lb. lint per acre, easily outyielded the BP50 group, which averaged 376 lb. Albar itself was most promising and gave 2 bales of lint per acre in one trial.

The district variety trials showed that the multiplication and distribution of DE715/6M would lead to a small yield advantage over S47, in addition to the big improvement in quality. The inclusion in some of these trials of Albar and its derivatives was exploratory only, but it was quite clear that the prospect of a considerable further yield increase from the issue of a high yielding Albar line was very promising.

A factorial agronomy trial was carried out to test ridged and flat cultivation, 3 planting dates, 2 varieties (S47 and Albar) and an insecticidal spray of DDT and toxaphene. It appeared that under high fertility conditions flat outyielded ridged; whilst under lower fertility conditions, ridged would be preferred to flat. The earliest planting, 29th May, gave the highest yield, although it was not significantly greater than the planting of 2nd July.

Albar significantly outyielded S47 in terms of seed cotton and in addition its ginning outturn was 36% as against 32% for S47. The insecticidal spraying gave a yield increase of 29%, in spite of the fact that the control of *Lygus* was not as effective as it might have been had the applications started earlier.

Kenya.

Unfavourable weather, late planting and damage by insect pests reduced the crops of both the Nyanza and Coast Provinces to the lowest levels for some years.

Pest surveys were carried out in the main cotton growing areas in Nyanza, *Lygus,* stainers and bollworm in that order being the main

causes of loss. In insecticide trials the yield increases over controls of the best treatments were: Kibos 225 lb. seed cotton per acre, Lake Shore 406 lb., Bungoma 639 lb., Elgon 311 lb.

Date of planting trials showed the usual rapid drop in yield late in the season, but plantings in April (average 860 lb. seed cotton per acre) did not differ significantly from those in May (916 lb.). Yields from plantings late in June, however, fell to less than half (439 lb.) and early August plantings halved again to 222 lb.

In the Coast Province the variety N17 is to be replaced by the Tanganyika strain Uk51.

Tanganyika.

Lake Province.

A record crop of over 150,000 bales was produced, being over three times the average of a few years ago. There was less bollworm damage than in many years, and the seed dressing applied to all planting cotton kept the primary phase of bacterial blight under control, though there was an appreciable amount of boll rot later in the season. *Fusarium* wilt was found on Kome Island, where Uk55 was being bulked, and a new multiplication area was started for 1957-58.

December planting again proved best, the yield dropping to approximately 80% with planting in mid January and to 50% or less in February.

There was a good response to nitrogenous top dressings, provided that sufficient phosphate was available. In general, the effect of superphosphate lasted for at least 3 years, but nitrogen was needed every year. Good results were also obtained from cattle manure. The results of tie ridging were not as good as in a dry season, but there is no doubt as to the general value of tie ridging over the years.

In plant breeding the straight selection and testing programme was continued, and the results of district plot trials confirmed the excellent progress made in recent years, as the following table shows: —

Yields as per cent. of Uk51.

Strain	*First year of general cultivation*	*Average of 4 Lake fringe plots*	*Average of 7 inland plots*
Mz561	1939-40	85%	73%
Uk46	1950-51	94	85
Uk48	1953-54	96	88
Uk51	1955-56	100	100
Uk55	Now being multiplied	107	115

The hybridisation programmes to increase resistance to bacterial blight were continued with Albar 51 and the Sudan variety BAR 14/38.

Eastern Province.

In this area, in view of insect pests and particularly bollworm, the widespread use of insecticides combined with February planting is essential for increased production. During 1957 a concerted effort was made by the Department of Agriculture to extend pest control, and in the Kilosa district 80 growers dusted their cotton crops with 8 lb. dust (10% DDT plus 3% BHC) per acre per week for 8 weeks. The results were very successful, the average return being nearly 1,000 lb. seed cotton per acre, very much higher than the general average. In addition to the actual effect of the insecticide, which is considerable, it is thought that the comparatively high initial cost tends to make the growers pay more attention to the general standard of cultivation. Thus, in the words of the report, "dusting helps to achieve good husbandry instead of being merely an addition to it".

Trials are being carried out at Ilonga to compare dusts and sprays and to find ways of decreasing the cost and of increasing the efficiency of the insecticides.

In plant breeding the aim is to produce plants with good jassid resistance, high yield and ginning outturn, whilst maintaining the present satisfactory lint quality of 47/10. I158, a multiline issue which has given a 25% yield increase over 47/10 in district trials, appears promising and is being multiplied for general distribution later.

Trials were also carried out at Ilonga and at Lumemo in the Kilombero valley to test varieties suitable for growing under irrigation. It is evident that varieties resistant to both jassid and bacterial blight will be needed, and the indications are that selection within the finer lint types of the local stocks will provide the best adapted varieties for any large scale irrigation project in the Rufiji Basin area.

NYASALAND.

One of the main objects of the season's work was to decide on the successor to CLB (Crown Land Bulk), which has been the commercial cotton of Nyasaland since 1933. CL20, previously favoured on account of its lint quality, gave disappointing results. It was more susceptible to jassid than other varieties, and in many cases gave poorer yields than CLB. One of the Albars, however—A637—again showed considerable promise. On 114 African cotton gardens in the Lower River it gave an average lint increase of 16% over CLB, whilst in trials at Makanga and Toleza the increases were 17% and 33% respectively. In addition to its all round improvements in yield and ginning percentage, A637 had better lint quality and increased resistance to

bacterial blight, and it will be multiplied to replace CLB as the commercial variety within the next few years.

Further information on ginning percentage was obtained from an analysis of ginnery records. An interesting graph, based on figures from the Chiromo ginnery, shows that the ginning percentage rises steadily throughout the season from 27% in April to 33% in October. This may be due partly to the seed losing moisture more rapidly than the lint, and partly to the normal reduction in size of seed throughout the season, but whatever the cause it seems certain that the drop in ginning percentage that has taken place since the early planting regime was introduced in 1952 is linked with this seasonal change. The bulk of the ginning is now carried out in June and July, instead of between August and October as was the case before 1952.

Nigeria.

Poor early rains, late planting and an early onset of the dry season led to a small crop. Pest and disease attack was not severe, the weather being the main cause of the low yields. Only 36·5 ins. of rain fell at Samaru, 8 ins. below the 30 year mean, but even in a season such as this, good yields of up to 1,000 lb. seed cotton per acre and over were obtained with early planting and the use of high yielding strains and fertilisers.

A definite tendency became apparent for high yield to be associated with below average lint length. The failure of line 26C/49160-23, thought previously to combine high yield and quality, has left a gap.

The superiority of 26J over 26C in earliness and yield was confirmed; no imported type showed any real promise of competing with these strains for commercial growth.

From previous agronomic work it was thought that factors other than soil nutrients had an overriding effect on yield, for example soil texture and surface impermeability. A range of soil surface treatments and mulches was therefore tested, and a remarkable response was obtained in field experiments from a heavy surface mulch of groundnut shell. Cross-tying of ridges, in this season of below average rainfall, also gave a 14% increase in yield of seed cotton.

The usual records of insect pest incidence were continued. Red bollworm was in general found more than twice as frequently as any other type, whilst *Campylomma* populations were very high in October.

In a time of sowing and insecticide trial at Samaru the yields in lb. seed cotton per acre of unsprayed plots in successive fortnights from 15th June to 30th August were 277, 252, 248, 87 and 13, showing no great change between sowings from 15th June to 31st July but a very big drop thereafter. The percentage increases from spraying with

DDT and BHC for the same five fortnightly periods were 41, 73, 28, 109 and 138.

A further trial at Samaru gave an increase of 36% with DDT and BHC and a 29% increase with endrin.

At Mokwa cotton stainers are largely responsible for low yields and poor quality, and here sprays had an even greater effect, in one case increasing the seed cotton yield by over 1,000 lb. per acre from 455 lb. to 1,483 lb.

Work on bacterial blight was expanded, and trials showed that unweathered trash, from a diseased crop in the previous year, was a potential hazard to the following cotton crop even when the seed was treated before sowing. Where the trash had been fully exposed, this hazard was very greatly reduced, even in the driest season for over 30 years. An experiment on seed treatments and incidence of bacterial blight showed that the efficiency of disinfection, as reflected by incidence of disease at the seedling and young plant stages, was not impaired by factors such as state of seed, time of planting or differences in site.

Republic of the Sudan.

A record crop was harvested of well over 700,000 bales. Record yields were also obtained from the Gezira Research Station, where 63 acres under Sakel averaged 2,037 lb. seed cotton per acre and 121 acres of X1730A averaged 2,434 lb.

The blackarm situation in the Gezira and at Shambat showed a very definite change in 1956-57. A systemic type of infection occurred, which developed early in the season and produced leaf and stem lesions later. All $B_2 B_3$ types, previously considered near-immune, showed full grade 7 to 8 susceptibility, but $B_2 B_3 B_6$ stocks showed full immunity. The attack was apparently due to waterlogging following heavy rain after irrigation. Later in the season the crop showed a remarkable recovery from this new form of blackarm, and this, together with the absence of premature senescence, the retention of the bottom crop and the very high boll weights, contributed towards the record crop. The importance of B_6 was emphasised during the season, and the first Sakel type bearing B_2 B_3 B_6 genes was passed to Medani for testing as BAR 14/48. The corresponding L type cottons—BAR 4/25 and BAR 5/7—were also under test. Yield figures were encouraging, and practically all these types showed complete immunity to systemic attack.

Blackarm resistance genes were also transferred to Karnak, Pima S1, Acala 4-4-2, BP52, PSS, SP84 and Wilds.

Since the blackarm resistant Sakel type BAR 14/25 has no leafcurl resistance, this character is being introduced by crosses with L cotton and with BLR 14/16.

It is evident from the work accomplished so far that the hairiness gene H_1 reduces both yield and grade, and the gene H_3 will therefore be used as far as possible in future in the jassid resistance work.

In case an alternative type of cotton should be required in future when the acreage under cotton is expected to expand considerably, Tanguis was crossed to BAR 14/25 in order to combine the whiteness, high ginning outturn and high boll weight of Tanguis with the earliness and blackarm resistance of BAR 14/25.

In an attempt to improve the strength of the American raingrown types, Hopi Acala was crossed with BAR 7/8.2 and BAR 11/7.

The standard variety trials were continued at Turabi, the Gezira Research Station and Hag Abdulla. In general, the new derivatives showed up satisfactorily in comparison with the standard S and L types. For the last two years the S types have yielded particularly well in the south, where they normally yield poorly, and the possibility of a change in the climatic regime was put forward.

In view of the gradual quality deterioration during the last 10 years, the effect on grade of environment, spraying and manuring is being very carefully investigated.

In the raingrown areas BAR 7/8.2 again yielded well, giving a 9% increase in lint over BAR 7/8.1 and a 35% increase over BAR 11/7. BAR 11/7, however, is of higher quality, and efforts are being made both to improve the quality of BAR 7/8 and to improve the yield in BAR 11/7.

In agronomy trials cotton on the flat again outyielded ridged and tie-ridged cotton. Ridging is a safeguard against sheet erosion, but otherwise it appears to reduce and not increase yield.

Aden.

The floods were late and consequently there was a high proportion of late sowing. The standard of husbandry in Abyan was very low, probably a reflection of the absence of farming tradition and of the too easy returns in the early years of the scheme. Failure to keep the excessive weed growth under control led to heavy competition for available moisture and a rapid closing down of the crop. Sudan bollworm also contributed to the damage. The final Abyan crop was only 14,000 bales from 24,000 acres, giving a return of 233 lb. lint per acre. In contrast, Lahej, where the standard of cultivation was satisfactory, produced 10.000 bales from 8,000 acres, giving an average return of 500 lb. lint per acre, or over twice as much as in Abyan.

Variety tests confirmed that the Sudan L types were best suited to the conditions, and nucleus bulks of BAR XL1 were continued. In an attempt to transfer to X1730A the resistance to root rot present in Wilds Early, crossing between these two varieties was continued.

Experiments were commenced to test 2, 3 and 4 year rotations against continuous cotton. It will, of course, be some years before any results are available. The use of fertilisers again led to an increase in yield, sometimes of as much as 50% with nitrogen. Early applications appear to be advisable.

In an effort to ascertain the amount of water required to produce a satisfactory crop of cotton, study was made of the available data on meteorology and local practice, and in addition a small field experiment was carried out. The preliminary results suggest that the water duty required is much less than was previously supposed and that 33 cms. would be adequate to produce a satisfactory yield.

The report also contains a section of Abyan root rot of cotton, written by Dr. Wickens, who visited Aden to advise on this disease. On his recommendation, a more detailed study is to be undertaken during the 1957-58 season by Mr. Logan of the Namulonge Research Station in Uganda.

West Indies.

After a long close season extending from November 1955, Montserrat planted late in the year, instead of in the spring, for the first time since 1911. Though the acreage planted was low, the yield per acre—163 lb. lint—compared favourably with the average of 129 lb. obtained over the last five years. The quality of the lint did not seem to be affected by the change in planting date, as had been thought possible, but it is too early to give any definite verdict on the change. In St. Kitts also, after three seasons of May planting, cotton was sown in August, bringing all the islands into line with August/September planting.

The V135 maintenance programme was continued in St. Vincent, together with the wilt resistance trial. A surprising feature was the low resistance to *Fusarium* wilt shown by the present St. Vincent stocks of V135 (only 6·3% wilt free at the end of season) compared with older stocks maintained in Antigua (53·9%). MSI (95·7%) and Seabrook (98·9%) were definitely more resistant than any other variety tried.

Selection and testing were also carried out on MSI, VH8 and VH10 There was little to choose between MSI and VH8 in yield, but VH10, over four trials in Antigua and Montserrat, gave increases ranging from 9% to 17%. This variety is being multiplied for possible use on a larger scale in the future.

COTTON PRODUCTION

(in bales of 400 lb.)

	Record Crops		*Recent Crops*		
	Season	*Amount*	*1954-55*	*1955-56*	*1956-57*
Uganda	1937-38	417,179	299,935	363,675	372,433
Kenya	1936-37	22,166	12,963	16,297	7,959
Tanganyika	1956-57	*167,900*	122,058	133,581	*167,900*
Nyasaland	1934-35	21,006	15,407	5,734	*7,000*
*Nigeria	1954-55	187,741	187,741	154,436	*143,471*
Sudan	1956-57	704,645	486,063	528,344	704,645
Aden	1955-56	30,700	22,140	30,700	28,310
West Indies	1940-41	9,312	6,377	5,457	3,739
Total	1956-57	*1,435,457*	1,152,684	1,238,234	*1,435,457*

5-Year Averages.

	1921-22 to 1925-26	*1926-27 to 1930-31*	*1931-32 to 1935-36*	*1936-37 to 1940-41*	*1941-42 to 1945-46*	*1946-47 to 1950-51*	*1951-52 to 1955-56*
Uganda	128,300	159,100	271,700	345,000	208,300	295,800	352,300
Kenya	1,500	1,300	7,400	15,600	6,800	8,300	14,400
Tanganyika	16,600	22,200	42,700	61,700	39,100	48,400	97,300
Nyasaland	5,800	5,300	11,200	9,600	9,100	8,100	12,100
*Nigeria	28,900	28,600	35,500	45,400	29,100	49,100	138,900
Sudan	53,200	142,700	214,800	321,500	297,700	357,200	460,400
Aden	—	—	—	—	—	3,800	18,400
West Indies	4,800	5,200	3,600	6,800	4,800	4,900	5,100
Total	239,100	364,400	586,900	805,600	594,900	775,600	1,098,900

Figures in italics are estimates.

*Ginnery figures, not including amounts used for hand spinning.

COTTON PLANTING AND PICKING DATES

	Planting	*Picking*
Uganda	June-August	December-March
Kenya	May-August	December-February
Tanganyika:		
Lake Province	November-January	April-August
Eastern Province	February-April	July-October
Nyasaland:		
Southern and Central Provinces	December-January	June-July
Northern Province	May-June	November-December
Northern Nigeria	June-August	November-February
Sudan:		
Irrigated	August-September	January-May
Raingrown	June-August	October-February
Aden	August-October	February-May
West Indies	August-October	January-April

YIELDS OF LINT PER ACRE

The figures shown below have been included to give some idea of the yields obtained from cotton grown in different territories and under different conditions. Only those countries which publish official acreage figures have been included.

When looking at the figures it should be borne in mind that in most territories in Africa cotton is grown by peasant cultivators on small and scattered holdings, and is sometimes interplanted with other crops. In these circumstances accurate estimates of the area planted to cotton are very difficult to obtain, and this naturally makes it difficult to arrive at the true yield per acre.

YIELDS OF LINT IN POUNDS PER ACRE.

	Average 1935-36 to 1938-39	*1953-54*	*1954-55*	*1955-56*	*1956-57*
Uganda—Raingrown	94	98	69	91	94
Kenya (Nyanza) ,,	—	56	60	62	53
Nyasaland ,,	48	97	110	51	103
West Indies. S.I. ,,	122	127	176	195	153
Sudan:					
American ,,	75	118	112	132	93
Sakel—Flood	203	125	125	248	103
Gravity and pump	430	489	434	469	584
Aden, Abyan—Flood	—	395	220	350	227
Lahej ,,	—	—	360	592	457

EMPIRE COTTON GROWING CORPORATION

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PUBLICATIONS

EMPIRE COTTON GROWING REVIEW.

" The Empire Cotton Growing Review " is the official organ of the Empire Cotton Growing Corporation. It is published quarterly (in January, April, July and October) and contains original articles, notes on scientific, commercial and technical literature, and specialized advertisements. The price of each issue is **5s. 0d.**

PROGRESS REPORTS FROM EXPERIMENT STATIONS.

The reports for the seasons up to and including 1950-51 were published in seasonal volumes; the following are still in print and available at **3/-** per volume.

1923-25 (one volume), 1926-27, 1931-32, 1934-35, 1935-36, 1942-43, and 1945-46 to 1950-51.

From 1951-52 the reports from each territory were published individually each season. A few of the 1951-52 reports are out of print, but all others are available at **1s.** per report or **7s. 6d.** for the seasonal set.

ANNUAL REPORTS.

The Annual Reports of the Corporation and booklets describing its work are available on application, free of charge.

RESEARCH MEMOIRS.

This series comprises reprints of major scientific papers published by the staff of the Corporation since the war, as listed below. All except those marked with an asterisk as out of print are available at **2s. 6d.** each.

No. 1. Breeding Cotton Resistant to Blackarm Disease. R. L. Knight. 1946.

No. 2. Notes on the Classification and Distribution of Genera related to *Gossypium*. J. B. Hutchinson. 1947.

* **No. 3.** The Rôle of Major Genes in the Evolution of Economic Characters. R. L. Knight. 1948.

* **No. 4.** The Development of Internal Boll Disease of Cotton in Relation to Time of Infection. E. O. Pearson. 1948.

* **No. 5.** Observations on the Development of the Cotton Boll, with Particular Reference to Changes in Susceptibility to Pests and Diseases. R. C. Rainey. 1948.

No. 6. Experimental Methods with Cotton.—Sulphuric Acid Treatment of Cotton Seeds. Effects of Gap-filling on Development and Yield. D. MacDonald, W. L. Fielding and D. F. Ruston. Ginning Percentage and its Determination in Variety Trials. Determination of Staple Length in Single Plant Selections and Variety Trials. W. L. Fielding. 1948.

No. 7. Jassid Resistance and Hairiness of the Cotton Plant. F. R. Parnell, H. E. King and D. F. Ruston. 1949.

No. 8. Response of Cotton to Leaf-Curl Disease. J. B. Hutchinson, R. L. Knight and E. O. Pearson. 1950.

LIST OF PUBLICATIONS

No. 9. Confidence Limits of Expected Monthly Rainfall. H. L. Manning. 1951.

No. 10. The Distribution of Wild Species of *Gossypium* in the Sudan. R. L. Knight. The Cytological Relationships of *Gossypium somalense:* Gürke. H. Douwes. 1951.

No. 11. The Evolution of Blackarm Resistance in Cotton. R. L. Knight and J. B. Hutchinson. 1951.

No. 12. Intra-Specific Differentiation in *Gossypium hirsutum.* J. B. Hutchinson. 1951.

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No. 21. Cotton Breeding in the Sudan. R. L. Knight. 1955.

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No. 29. Treatment of Cotton Seed against Bacterial Blight (*Xanthomonas malvacearum* (E. F. Smith) Dowson). G. M. Wickens. 1958.

LIST OF PUBLICATIONS

MISCELLANEOUS.

A very large number of papers written in whole or part by members of the staff have not been reprinted as Memoirs, and are not in general available for sale. A complete list of such papers published in the last three years is printed below.

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Munro, J. M. "Research increases cotton output in Tanganyika". Foreign Agriculture, Vol. 19, No. 12, p. 242.

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Hutchinson, Sir Joseph. "Cotton spacing in the British West Indies". Empire Cotton Growing Review, Vol. 33, No. 2, p. 121.

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